

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES  
PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG

(19) Weltorganisation für geistiges Eigentum  
Internationales Büro



(43) Internationales Veröffentlichungsdatum  
7. Dezember 2000 (07.12.2000)

PCT

(10) Internationale Veröffentlichungsnummer  
**WO 00/73430 A3**

(51) Internationale Patentklassifikation<sup>7</sup>: **A61K 48/00**,  
39/395, C07K 16/42, 14/00, 16/30, A61K 39/00, A61P  
35/00, 31/00, C12N 15/13, 15/10

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(21) Internationales Aktenzeichen: **PCT/DE00/01809**

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(22) Internationales Anmeldedatum:  
29. Mai 2000 (29.05.2000)

(81) Bestimmungsstaaten (*national*): AE, AG, AL, AM, AT,  
AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ,  
DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU,  
ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS,  
LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO,  
NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR,  
TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(25) Einreichungssprache: **Deutsch**

(26) Veröffentlichungssprache: **Deutsch**

(30) Angaben zur Priorität:  
199 24 405.7 27. Mai 1999 (27.05.1999) **DE**  
199 43 016.0 9. September 1999 (09.09.1999) **DE**

(84) Bestimmungsstaaten (*regional*): ARIPO-Patent (GH,  
GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), eura-  
sisches Patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
europäisches Patent (AT, BE, CH, CY, DE, DK, ES, FI,  
FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI-Patent  
(BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE,  
SN, TD, TG).

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Veröffentlicht:  
— Mit internationalem Recherchenbericht.

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(88) Veröffentlichungsdatum des internationalen  
Recherchenberichts: 29. März 2001

[Fortsetzung auf der nächsten Seite]

(54) Title: **VACCINES AGAINST CONFORMATION-DEPENDENT ANTIGENS AND AGAINST ANTIGENS THAT ARE  
NOT OR ARE NOT ONLY PROTEINS OR PEPTIDES**

(54) Bezeichnung: **VAKZINE GEGEN KONFORMATIONSABHÄNGIGE ANTIGENE SOWIE GEGEN ANTIGENE, DIE  
KEINE ODER NICHT AUSSCHLIESSLICH PROTEINE ODER PEPTIDE SIND**

(57) Abstract: The invention relates to a method that makes it possible to use the highly effective technology of vaccination with deoxyribonucleic acid (DNA) not only on sequence epitopes of proteins or peptides, but also on conformation epitopes. The method also permits the use of DNA vaccination for antigens that are not or are only partially proteins or peptides. The preferred inventive vaccine contains a desoxyribonucleic acid (DNA) as its principal component. This desoxyribonucleic acid codes for a peptide sequence which represents the immunological imitation (mimicry) of a conformation-dependent antigen including protein conformation epitopes or of an antigen that is not or is only partially a protein or peptide. The mimicry peptide, which is also or can also be part of the inventive vaccine, is either an antiidiotypic antibody, an antibody fragment, a peptide derived therefrom or a specifically binding peptide obtained by selection from a peptide gene bank. The invention can be used in medical and veterinary medical immunology, including in the adjuvant therapy of tumor diseases.

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(57) Zusammenfassung: Die Erfindung betrifft ein Verfahren, das es erlaubt, die hocheffektive Technologie der Vakzinierung mittels Desoxyribonukleinsäure (DNA) nicht nur auf Sequenzepitope von Proteinen oder Peptiden, sondern auch auf Konformationsepitope anzuwenden. Dieses Verfahren ermöglicht darüber hinaus die Nutzung der DNA-Vakzinierung auch bei solchen Antigenen, die keine oder nur teilweise Proteine oder Peptide sind. Die bevorzugte erfindungsgemäße Vakzine enthält als wesentlichen Bestandteil eine Desoxyribonukleinsäure (DNA), die eine Peptidsequenz kodiert, welche ihrerseits die immunologische Imitation (Mimikry) eines konformationsabhängigen Antigens einschließlich Protein-Konformationsepitope oder eines Antigens, das kein oder nur teilweise Protein oder Peptid ist, darstellt. Das Mimikry-Peptid, das ebenfalls Teil der erfindungsgemäßen Vakzine ist oder sein kann, ist entweder ein antiidiotypischer Antikörper, ein Antikörperfragment, ein daraus abgeleitetes Peptid oder ein durch Selektion aus einer Peptid-Genbank erhaltenes spezifisch bindendes Peptid. Anwendungsgebiete der Erfindung sind die medizinische und die veterinärmedizinische Immunologie, darunter die adjuvante Therapie von Tumorerkrankungen.



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*Zur Erklärung der Zweibuchstaben-Codes, und der anderen  
Abkürzungen wird auf die Erklärungen ("Guidance Notes on  
Codes and Abbreviations") am Anfang jeder regulären Ausgabe  
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# INTERNATIONAL SEARCH REPORT

International Application No

PCT/DE 00/01809

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61K48/00 A61K39/395 C07K16/42 C07K14/00 C07K16/30  
A61K39/00 A61P35/00 A61P31/00 C12N15/13 C12N15/10

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C07K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

MEDLINE, LIFESCIENCES, AIDSLINE, CANCERLIT, EMBASE, CHEM ABS Data, SCISEARCH, STRAND, BIOSIS, WPI Data, EPO-Internal, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 98 00444 A (MAX DELBRUECK CT FUER MOLEKULA ;KARSTEN UWE (DE)) 8 January 1998 (1998-01-08) cited in the application the whole document ---	3,4,6, 10,13, 14,16
X	EP 0 508 282 A (KYOWA HAKKO KOGYO KK) 14 October 1992 (1992-10-14)  column 1, line 10-15 column 2, line 45-50 example 2 claims 1,14  ---  -/--	3,4,6, 10,13, 14,16



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

### \* Special categories of cited documents :

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Date of the actual completion of the international search

9 November 2000

Date of mailing of the international search report

24/11/2000

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# INTERNATIONAL SEARCH REPORT

Int. J. Application No.

PCT/DE 00/01809

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>POTTER V ET AL: "DNA vaccination with A scFv of the anti-idiotypic antibody 105Ad7 induces a TH1 immune response."</p> <p>BRITISH JOURNAL OF CANCER, vol. 78, no. SUPPL. 2, 1998, page 18 XP000960534</p> <p>Joint Meeting of the British Oncological Association, the Association of Cancer Physicians and the Royal College of Radiologists; Nottingham, England, UK; July 5-7, 1998 ISSN: 0007-0920 the whole document</p>	1,2,5-9, 13
A	---	19-26
X	<p>GOLLASCH H ET AL: "Identification of immunogenic peptide-mimics for the Thomsen-Friedenreich-glycoantigen."</p> <p>ANNALS OF HEMATOLOGY, vol. 77, no. SUPPL. 2, 1998, page S84 XP000960533</p> <p>Annual Congress of the German and Austrian Societies of Hematology and Oncology; Frankfurt, Germany; October 25-28, 1998 ISSN: 0939-5555 the whole document</p>	1-10, 13-16, 23-26
X	<p>PINILLA CLEMENCIA ET AL: "All-D peptides recognized by an anti-carbohydrate antibody identified from a positional scanning library."</p> <p>JOURNAL OF MOLECULAR BIOLOGY, vol. 283, no. 5, 13 November 1998 (1998-11-13), pages 1013-1025, XP002152467 ISSN: 0022-2836</p> <p>page 283, right-hand column, line 2,3 page 1014, left-hand column, paragraph 3 page 1014, right-hand column, paragraph 3 page 1019, left-hand column, paragraph 2 page 1020, right-hand column, paragraph 3 page 1021, left-hand column, paragraph 2</p> <p style="text-align: center;">---</p> <p style="text-align: center;">-/--</p>	3-8, 11-16

# INTERNATIONAL SEARCH REPORT

Inte      lonal Application No  
PCT/DE 00/01809

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>LOSMA M J ET AL: "MIMICRY OF A CARCINOEMBRYONIC ANTIGEN EPITOPE BY A RAT MONOCLONAL ANTI-IDIOTYPE ANTIBODY" INTERNATIONAL JOURNAL OF CANCER,US,NEW YORK, NY, vol. 56, no. 4, 15 February 1994 (1994-02-15), pages 580-584, XP000577759 ISSN: 0020-7136 abstract page 580, left-hand column, paragraph 2 page 580, right-hand column, paragraph 4 -page 581, left-hand column, paragraph 3 ---</p>	1-10,13
A	<p>APOSTOLOPOULOS V ET AL: "Carbohydrate /peptide mimics: effect on MUC1 cancer immunotherapy." JOURNAL OF MOLECULAR MEDICINE, (1999 MAY) 77 (5) 427-36. REF: 57 , XP000960532 page 429, left-hand column, paragraph 1 -right-hand column, paragraph 2 page 432, left-hand column, paragraph 3 -right-hand column, paragraph 2 ---</p>	1-26
A	<p>KARSTEN UWE ET AL: "Enhanced binding of antibodies to the DTR motif of MUC1 tandem repeat peptide is mediated by site-specific glycosylation." CANCER RESEARCH, vol. 58, no. 12, 15 June 1998 (1998-06-15), pages 2541-2549, XP002112486 ISSN: 0008-5472 abstract ---</p>	1-26
P,X	<p>WO 99 40433 A (UNIV PENNSYLVANIA ;KIEBER EMMONS THOMAS (US)) 12 August 1999 (1999-08-12) page 7, line 20-29 page 8, line 24 -page 9, line 11 page 22, line 7 -page 24, line 3 page 25, line 11-16 ---</p>	1-18
P,X	<p>WO 99 54457 A (POLONELLI LUCIANO ;TETI GIUSEPPE (IT); CHIRON SPA (IT)) 28 October 1999 (1999-10-28) page 2, line 12-21 page 28, line 14-21 page 31, line 12-16 page 35, line 14 -page 37, line 16 -----</p>	1-8, 11-16

# INTERNATIONAL SEARCH REPORT

Information on patent family members

Int. l. Application No

PCT/DE 00/01809

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9800444 A	08-01-1998	DE 19627352 A EP 0937105 A	02-01-1998 25-08-1999
EP 0508282 A	14-10-1992	JP 4304897 A CA 2064413 A	28-10-1992 02-10-1992
WO 9940433 A	12-08-1999	AU 2657599 A	23-08-1999
WO 9954457 A	28-10-1999	NONE	